

## WHAT IS CLAIMED IS:

1. A mutated penicillin expandase comprising an amino acid substitution at one or more residue positions corresponding to those in a wild-type expandase selected from the group consisting of methionine 73,  
5 serine 79, valine 275, leucine 277, cysteine 281, glycine 300, asparagine 304 and isoleucine 305, provided that the amino acid substitution at the residue position of asparagine 304 is not N304L.
2. The mutated penicillin expandase of Claim 1, wherein the wild-type expandase is obtained from *Streptomyces clavuligerus*.
- 10 3. The mutated penicillin expandase of Claim 1, comprising an amino acid substitution at one or more residue positions selected from the group consisting of M73T, S79E, V275I, L277K, C281Y, G300V, N304K, I305L and I305M.
4. An isolated nucleic acid molecule encoding the mutated  
15 penicillin expandase of Claim 1.
5. A recombinant vector comprising the isolated nucleic acid molecule of Claim 4 and a regulatory sequence.
6. Recombinant cells transformed with the nucleic acid molecule of Claim 4.
- 20 7. The recombinant cells of Claim 6, which are penicillin G producing cells.
8. The recombinant cells of Claim 7, which are *Penicillium*

*chrysogenum* cells.

9. A method for producing a mutated penicillin expandase comprising the steps of expressing the nucleic acid molecule of Claim 4 and recovering the mutated penicillin expandase.

5 10. A method for producing a mutated penicillin expandase comprising the steps of culturing the recombinant cells of Claim 6 to express the mutated penicillin expandase, and recovering the mutated penicillin expandase from the cell culture.

10 11. A process for producing 7-aminodesacetoxycephalosporanic acid (7-ADCA) comprising the steps of treating penicillin G with the mutated penicillin expandase of Claim 1 to produce phenylacetyl-7-ADCA and deacylating the phenylacetyl-7-ADCA to produce the 7-ADCA.

15 12. A process for producing 7-ADCA, which process comprises the steps of (a) cultivating penicillin G producing cells which is transformed with the nucleic acid molecule of Claim 4 under the conditions suitable for production of penicillin G and expression of the mutated penicillin expandase such that the penicillin G is expanded by the mutated expandase and phenylacetyl-7-ADCA is produced; (b) deacylating the phenylacetyl-7-ADCA to produce the 7-ADCA.

20 13. The process of Claim 12, wherein the penicillin G producing cells are *Penicillium chrysogenum* cells.

14. The process of Claim 12, wherein the phenylacetyl-7-ADCA produced from Step (a) is recovered by filtration and extraction steps.